

# BC337, BC337-16, BC337-25, BC337-40, BC338-25

## Amplifier Transistors

### NPN Silicon

#### Features

- Pb-Free Package is Available\*

#### MAXIMUM RATINGS

| Rating                                                                                    | Symbol         | BC337       | BC338 | Unit                       |
|-------------------------------------------------------------------------------------------|----------------|-------------|-------|----------------------------|
| Collector – Emitter Voltage                                                               | $V_{CEO}$      | 45          | 25    | Vdc                        |
| Collector – Base Voltage                                                                  | $V_{CBO}$      | 50          | 30    | Vdc                        |
| Emitter – Base Voltage                                                                    | $V_{EBO}$      | 5.0         |       | Vdc                        |
| Collector Current – Continuous                                                            | $I_C$          | 800         |       | mAdc                       |
| Total Device Dissipation<br>@ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 625<br>5.0  |       | mW<br>mW/ $^\circ\text{C}$ |
| Total Device Dissipation<br>@ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.5<br>12   |       | W<br>mW/ $^\circ\text{C}$  |
| Operating and Storage Junction<br>Temperature Range                                       | $T_J, T_{stg}$ | -55 to +150 |       | $^\circ\text{C}$           |

#### THERMAL CHARACTERISTICS

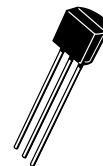
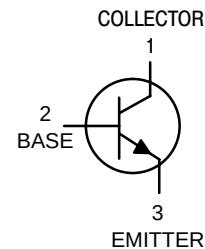
| Characteristic                             | Symbol          | Max  | Unit               |
|--------------------------------------------|-----------------|------|--------------------|
| Thermal Resistance,<br>Junction-to-Ambient | $R_{\theta JA}$ | 200  | $^\circ\text{C/W}$ |
| Thermal Resistance,<br>Junction-to-Case    | $R_{\theta JC}$ | 83.3 | $^\circ\text{C/W}$ |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.



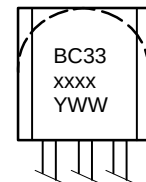
ON Semiconductor®

<http://onsemi.com>



TO-92 (TO-226)  
CASE 29

#### MARKING DIAGRAM



xxxx = Specific Device Code  
Y = Year  
WW = Work Week

#### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

# BC337, BC337-16, BC337-25, BC337-40, BC338-25

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic                                                                                                     | Symbol          | Min      | Typ    | Max        | Unit |
|--------------------------------------------------------------------------------------------------------------------|-----------------|----------|--------|------------|------|
| <b>OFF CHARACTERISTICS</b>                                                                                         |                 |          |        |            |      |
| Collector-Emitter Breakdown Voltage<br>( $I_C = 10\text{ mA}$ , $I_B = 0$ )<br>BC338                               | $V_{(BR)CE\ O}$ | 45<br>25 | —<br>— | —<br>—     | Vdc  |
| Collector-Emitter Breakdown Voltage<br>( $I_C = 100\text{ }\mu\text{A}$ , $I_E = 0$ )<br>BC338                     | $V_{(BR)CE\ S}$ | 50<br>30 | —<br>— | —<br>—     | Vdc  |
| Emitter-Base Breakdown Voltage<br>( $I_E = 10\text{ }\mu\text{A}$ , $I_C = 0$ )                                    | $V_{(BR)EB\ O}$ | 5.0      | —      | —          | Vdc  |
| Collector Cutoff Current<br>( $V_{CB} = 30\text{ V}$ , $I_E = 0$ )<br>( $V_{CB} = 20\text{ V}$ , $I_E = 0$ )       | $I_{CBO}$       | —<br>—   | —<br>— | 100<br>100 | nAdc |
| Collector Cutoff Current<br>( $V_{CE} = 45\text{ V}$ , $V_{BE} = 0$ )<br>( $V_{CE} = 25\text{ V}$ , $V_{BE} = 0$ ) | $I_{CES}$       | —<br>—   | —<br>— | 100<br>100 | nAdc |
| Emitter Cutoff Current<br>( $V_{EB} = 4.0\text{ V}$ , $I_C = 0$ )                                                  | $I_{EBO}$       | —        | —      | 100        | nAdc |

## ON CHARACTERISTICS

|                                                                                                                                   |                                                    |               |                                |                       |                               |     |
|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|---------------|--------------------------------|-----------------------|-------------------------------|-----|
| DC Current Gain<br>( $I_C = 100\text{ mA}$ , $V_{CE} = 1.0\text{ V}$ )<br><br>( $I_C = 300\text{ mA}$ , $V_{CE} = 1.0\text{ V}$ ) | BC337<br>BC337-16<br>BC337-25/BC338-25<br>BC337-40 | $h_{FE}$      | 100<br>100<br>160<br>250<br>60 | —<br>—<br>—<br>—<br>— | 630<br>250<br>400<br>630<br>— | —   |
| Base-Emitter On Voltage<br>( $I_C = 300\text{ mA}$ , $V_{CE} = 1.0\text{ V}$ )                                                    |                                                    | $V_{BE(on)}$  | —                              | —                     | 1.2                           | Vdc |
| Collector-Emitter Saturation Voltage<br>( $I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$ )                                          |                                                    | $V_{CE(sat)}$ | —                              | —                     | 0.7                           | Vdc |

## SMALL-SIGNAL CHARACTERISTICS

|                                                                                                             |          |   |     |   |     |
|-------------------------------------------------------------------------------------------------------------|----------|---|-----|---|-----|
| Output Capacitance<br>( $V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )                         | $C_{ob}$ | — | 15  | — | pF  |
| Current-Gain-Bandwidth Product<br>( $I_C = 10\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ , $f = 100\text{ MHz}$ ) | $f_T$    | — | 210 | — | MHz |

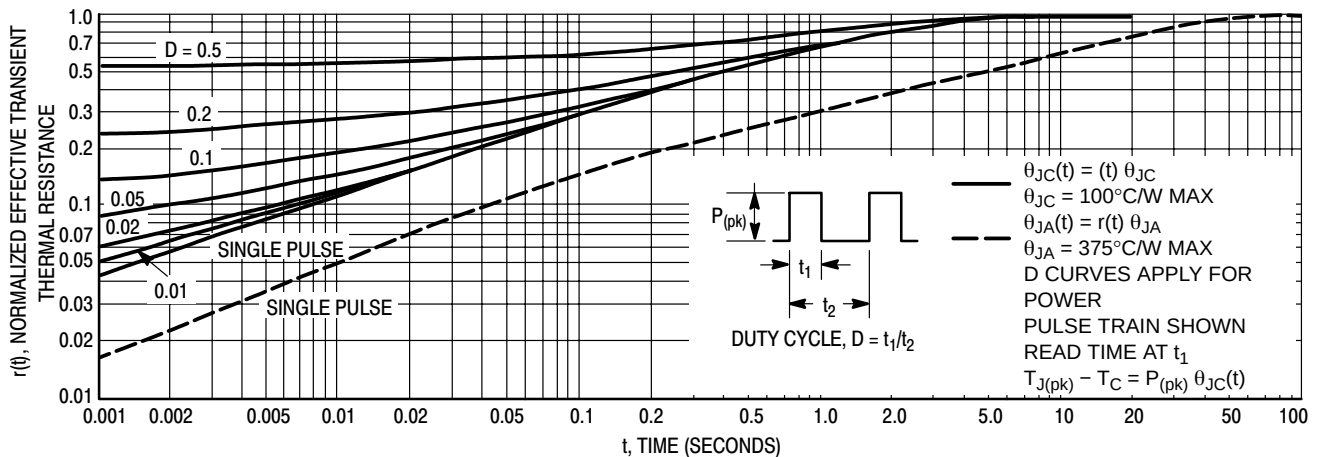


Figure 1. Thermal Response

# BC337, BC337-16, BC337-25, BC337-40, BC338-25

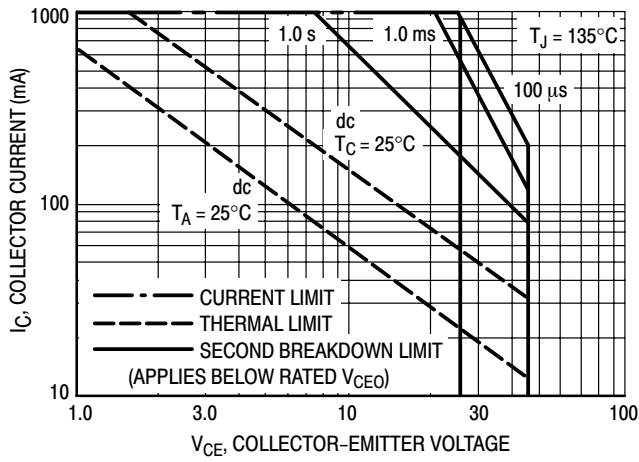


Figure 2. Active Region – Safe Operating Area

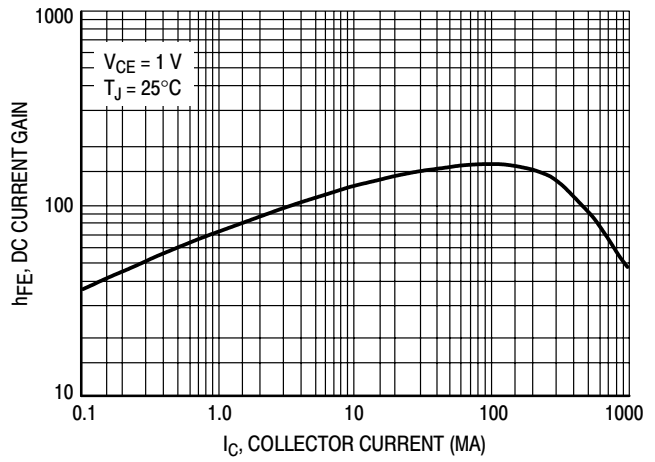


Figure 3. DC Current Gain

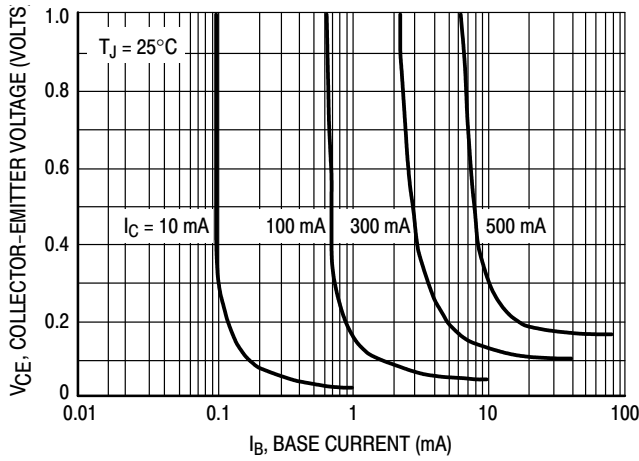


Figure 4. Saturation Region

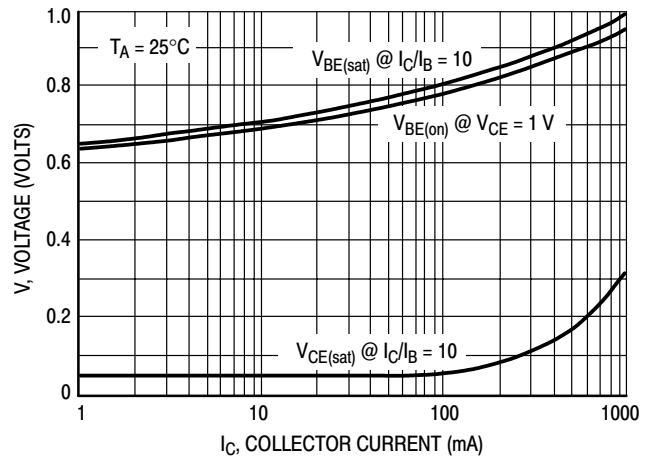


Figure 5. "On" Voltages

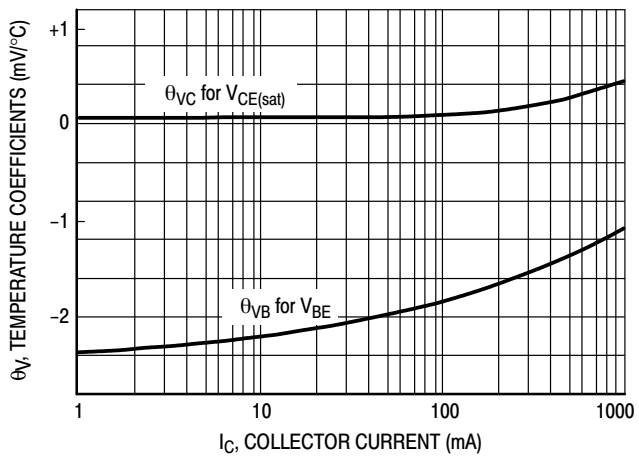


Figure 6. Temperature Coefficients

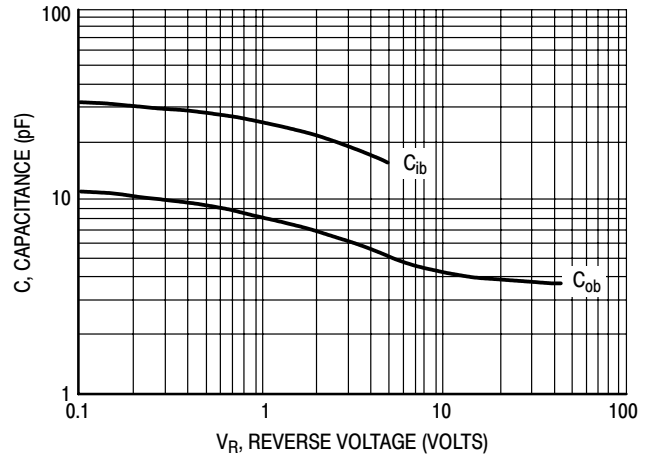


Figure 7. Capacitances

## BC337, BC337-16, BC337-25, BC337-40, BC338-25

### ORDERING INFORMATION

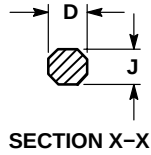
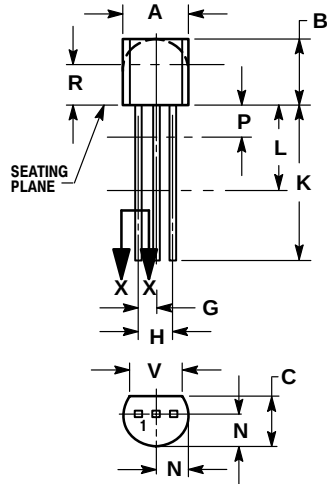
| Device       | Package            | Marking | Shipping <sup>†</sup>    |
|--------------|--------------------|---------|--------------------------|
| BC337        | TO-92              | 7       | 5000 Units / Bulk        |
| BC337RL1     | TO-92              | 7       | 2000 / Tape & Reel       |
| BC337ZL1     | TO-92              | 7       | 2000 / Tape & Ammunition |
| BC337-16     | TO-92              | 7-16    | 5000 Units / Bulk        |
| BC337-16RL1  | TO-92              | 7-16    | 2000 / Tape & Reel       |
| BC337-16ZL1  | TO-92              | 7-16    | 2000 / Tape & Ammunition |
| BC337-25     | TO-92              | 7-25    | 5000 Units / Bulk        |
| BC337-25RL1  | TO-92              | 7-25    | 2000 / Tape & Reel       |
| BC337-25ZL1  | TO-92              | 7-25    | 2000 / Tape & Ammunition |
| BC337-25ZL1G | TO-92<br>(Pb-Free) | 8-25    | 2000 / Tape & Ammunition |
| BC337-40     | TO-92              | 7-40    | 5000 Units / Bulk        |
| BC337-40RL1  | TO-92              | 7-40    | 2000 / Tape & Reel       |
| BC337-40ZL1  | TO-92              | 7-40    | 2000 / Tape & Ammunition |
| BC338-25ZL1  | TO-92              | 8-25    | 2000 / Tape & Ammunition |

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# BC337, BC337-16, BC337-25, BC337-40, BC338-25

## PACKAGE DIMENSIONS

TO-92 (TO-226)  
CASE 29-11  
ISSUE AL



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 0.175  | 0.205 | 4.45        | 5.20  |
| B   | 0.170  | 0.210 | 4.32        | 5.33  |
| C   | 0.125  | 0.165 | 3.18        | 4.19  |
| D   | 0.016  | 0.021 | 0.407       | 0.533 |
| G   | 0.045  | 0.055 | 1.15        | 1.39  |
| H   | 0.095  | 0.105 | 2.42        | 2.66  |
| J   | 0.015  | 0.020 | 0.39        | 0.50  |
| K   | 0.500  | ---   | 12.70       | ---   |
| L   | 0.250  | ---   | 6.35        | ---   |
| N   | 0.080  | 0.105 | 2.04        | 2.66  |
| P   | ---    | 0.100 | ---         | 2.54  |
| R   | 0.115  | ---   | 2.93        | ---   |
| V   | 0.135  | ---   | 3.43        | ---   |

### STYLE 17:

1. COLLECTOR
2. BASE
3. EMITTER

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